ONTARIO MINISTRY OF ENVIRONMENT
36936000025474

1969 OPERATING SUMMARY

ELMIRA

water pollution control plant

TD
367
.A56
E455
1969
MOE

COPY
1970
WATER
OMMISSION

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

TD
367
.A56
E455
1969

Elmira : water pollution control plant.
82204

Water management in Ontario

Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 195
Ontario

The operating efficiency and financial status of the water pollution control facilities operated for you in 1969 are presented in the following pages.

The regional operations engineer's comments and the statistical data will assist you in gauging the plant's level of performance. A new flow chart and up-to-date design data are also provided.

Various divisions and sections within the Commission have co-operated in providing what we trust is an accurate and concise annual operating summary.

Caverly

D.S. Caverly,
General Manager.

D McTavish

D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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RESOURCES COMMISSION

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135 St. Clair Avenue West
Toronto 7

ELMIRA

water pollution control plant

operated for

THE TOWN OF ELMIRA

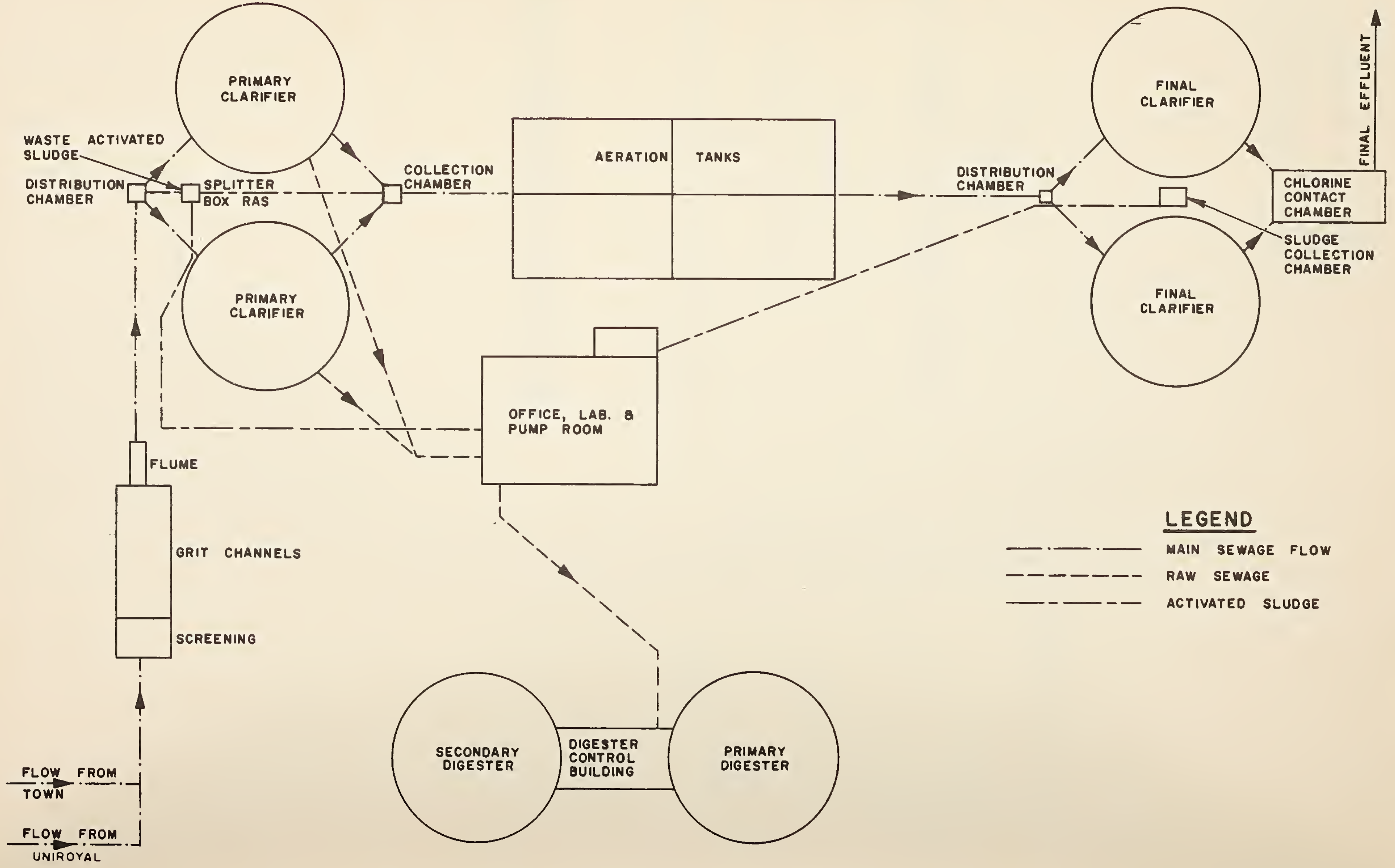
by the

ONTARIO WATER RESOURCES COMMISSION

1969 ANNUAL OPERATING SUMMARY

TOWN OF ELMIRA W.P.C.P.

SCHEMATIC OUTLINE OF PLANT SHOWING SEWAGE FLOW



DESIGN DATA

PROJECT NO. 2-0096-61

DESIGN FLOW		DESIGN POPULATION	5,000
Municipal	0.50 mgd		
Industrial	0.18 mgd		
Total	0.68 mgd		
BOD		SS	
Municipal	170 mg/l	Municipal	300 mg/l
Industrial	1100 mg/l	Industrial	320 mg/l
Combined	420 mg/l	Combined	306 mg/l

PRETREATMENT -- INDUSTRIAL WASTES

Type --
Balancing tank plus
neutralization facilities

PRIMARY TREATMENT

Screening

One coarse manually-cleaned bar screen

Grit Removal

Type: Grit channels, manually cleaned

Primary Sedimentation

Type: Link Belt
Size: Two 40' dia x 8' swd (125,000 gal)
Retention: 4.42 hours
Loading: Surface, 270 gal/ft^2/day
Weir, 2,700 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical aeration
Size: Four 30' x 30' x 14.2' (48,00 cu ft or 300,000 gal)
Retention: 10.6 hours

Aerators

Type: Four Ames-Crosta

Secondary Sedimentation

Type: Rex Chainbelt
Size: Two 45' dia x 7' swd (22,300 cu ft or 139,000 gal)
Retention: 4.9 hours
Loading: Surface, 214 gal/ft^2/day
Weir, 2,400 gal/ft/day

CHLORINATION

Type: F & P

Chlorine Contact Chamber

Size: Two 30' x 6' x 4.74' (1,700 cu ft or 10,600 gal)
Retention: 22.5 min

OUTFALL

- to Canangagique Creek

SLUDGE HANDLING

Digestion System

Type: Two-stage digestion
Primary - One 30' dia tank with two Dorr mixers (97,100 gal)
Secondary - One 30' dia tank (15,200 cu ft or 94,700 gal)

'69 REVIEW

GENERAL

The Elmira Water Pollution Control Plant treated 193.74 million gallons of sewage at a total cost of $41,145.28. The unit cost for treating one million gallons increased from $162.13 in 1968 to $212.37. The operating cost per pound of BOD removed was six cents. The increase in unit flow costs was due to the marked decrease in the total plant flows of about 61 million gallons.

The average daily flow of 0.53 mil. gal. was 22% less than the design capacity of 0.68 mgd. This design flow was exceeded 15% of the time during the year. The decrease in flow is attributed to the stoppage of infiltration at critical points in the Town of Elmira.

Difficulty was again experienced throughout the year in maintaining a healthy, efficient activated sludge, in the aeration section. The problem was attributed directly to the type of waste received from UniRoyal Limited.

Due to the type of sludge and retention period the digesters were not operated in 1969.

PLANT FLOWS and CHLORINATION

The average daily flow from the Town was 0.384 mil. gal. as compared with 0.542 mil. gal. in 1968, a decrease of 29.6%. The Town design flow of 0.5 mgd was exceeded 30% of the time.

The average daily flow from UniRoyal Limited decreased from 0.155 mil. gal. in 1968 to 0.147 mil. gal. in 1969. The design flow of 0.18 mgd was exceeded 40% of the time.

The average final effluent chlorine dosage was 2.7 milligrams per litre. A total of 5,294 lbs. of chlorine was required.

PLANT EFFICIENCY

The average BOD concentration in the Town raw sewage was 273 mg/l, compared with 163 mg/l the previous year. The BOD design concentration of 170 mg/l was exceeded 85% of the time. The average suspended solids concentration of the Town's sewage was 215 mg/l, an increase of 37 mg/l over the previous year. The design concentration for suspended solids of 300 mg/l was exceeded only 12% of the time.

The average BOD concentration from UniRoyal of 1107 mg/l represented an increase of 356 mg/l over the previous year. The design concentration of 1100 mg/l was exceeded 50% of the time. The average suspended solids concentration in UniRoyal wastes was 140 mg/l, an increase of 28% in suspended solids concentrations over the previous year. The design concentration for suspended solids of 320 mg/l was exceeded only 8% of the time.

The average BOD concentration of the combined wastes of 453 mg/l was 8% above the design concentration of 420 mg/l. The design BOD concentration was exceeded 48% of the time. The average suspended solids concentration of the combined effluent of 184 mg/l represents an increase of 38 mg/l over the previous year. The design suspended solids concentration of 306 mg/l was exceeded approximately 10% of the time.

Reductions of 77% BOD and 47% suspended solids were experienced in 1969, compared to 82% and 58% in 1968. The final effluent average BOD and suspended solids concentrations of 77 mg/l and 95 mg/l greatly exceeded the OWRC objectives of 15 mg/l for both. The average raw sewage strength was 460 mg/l for BOD and 180 mg/l for suspended solids.

CONCLUSIONS and RECOMMENDATIONS

The final effluent quality from the Elmira Water Pollution Control Plant is very poor, and is attributed directly to the type of industrial wastes received from UniRoyal Limited.

UniRoyal should take steps to correct its wastes so that the plant can produce an effluent equal to or close to OWRC objectives.

PROJECT COSTS

NET CAPITAL COST (Final)		$582,424.56
DEDUCT - Payments from Municipality	$100,085.00	
- Portion financed by CMHC/MDLB (Final)	388,449.01	488,534.01
Long Term Debt to OWRC		$ 93,890.55

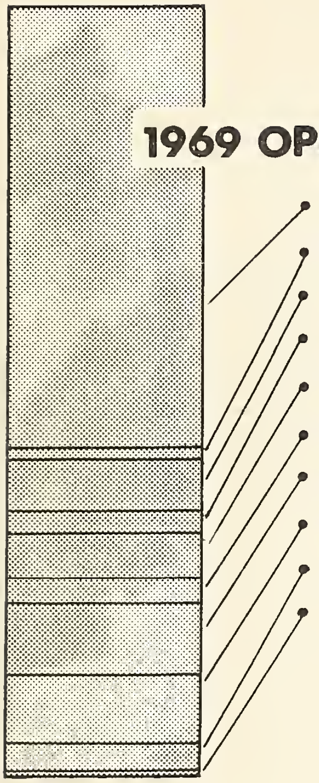
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1969	$ 10,978.25

Net Operating	$ 41,145.28
Debt Retirement	1,895.00
Reserve	3,480.82
Interest Charged	5,256.45
TOTAL	$ 51,777.55

RESERVE ACCOUNT

Balance @ January 1, 1969	$ 10,197.84
Deposited by Municipality	3,480.82
Interest Earned	657.81
	$ 14,336.47
Less Expenditures	-
Balance @ December 31, 1969	$ 14,336.47

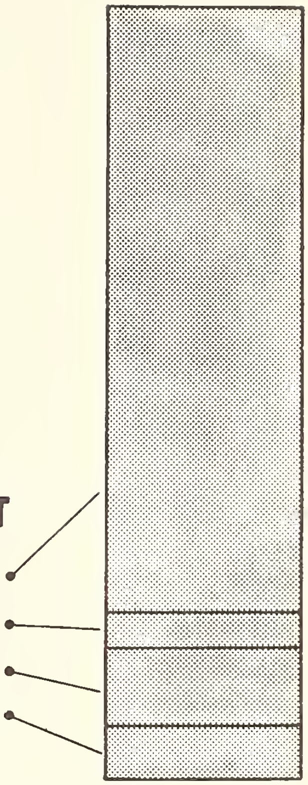
1969 OPERATING COSTS



PAYROLL	57 %
FUEL	2 %
POWER	7 %
CHEMICALS	3 %
GENERAL SUPPLIES	6 %
EQUIPMENT	3 %
REPAIRS & MAINTENANCE	9 %
SUNDRY	9 %
WATER	3 %
TRAVEL	1 %

TOTAL ANNUAL COST

NET OPERATING	79 %
DEBT RETIREMENT	4 %
INTEREST	10 %
RESERVE FUND	7 %



Yearly Operating Costs

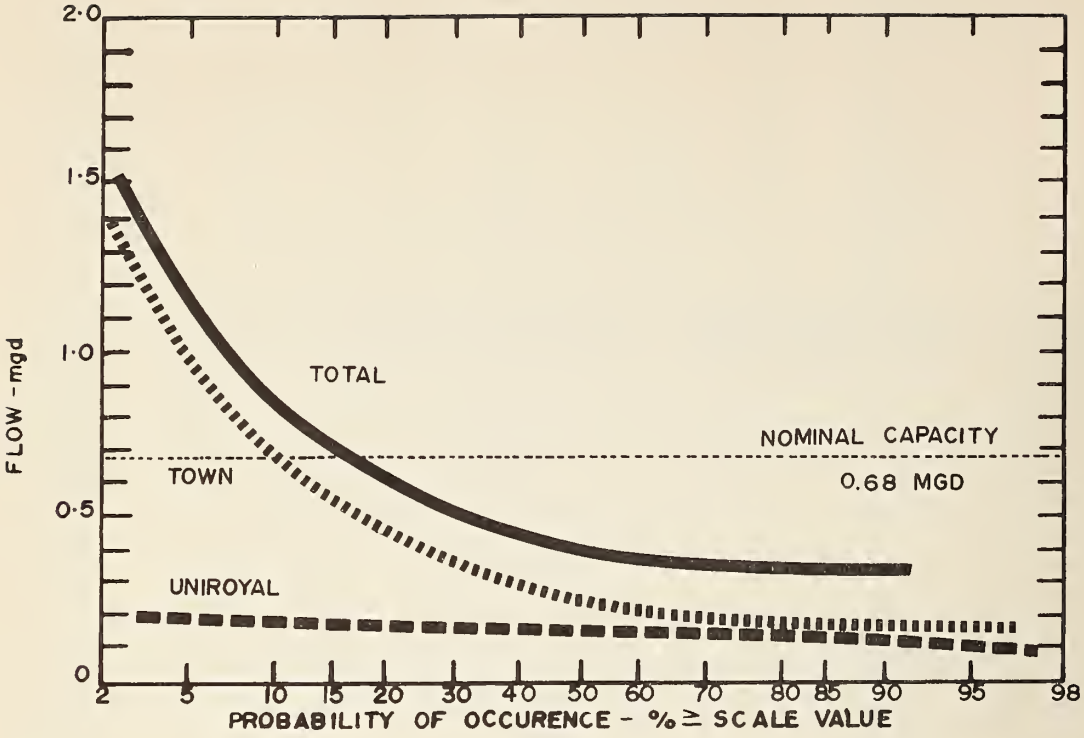
YEAR	MILLION GALLONS TREATED	TOTAL OPERATING COSTS	COST PER MILLION GAL	COST PER LB OF BOD REMOVED
1965	158.41	$26,960.67	$170.20	16 cents
1966	202.88	45,931.52	226.40	10 cents
1967	255.85	41,031.41	161.82	7 cents
1968	255.00	41,343.07	162.13	6 cents
1969	193.744	41,145.28	212.37	6 cents

Monthly Operating Costs

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY *	WATER	TRAVEL
JAN	3349.51	2469.79	-	141.53	278.33	-	202.39	-	-	19.50	237.97	-
FEB	2838.12	1674.34	-	-	282.49	238.61	197.71	25.07	231.58	169.42	-	18.90
MAR	3037.50	1282.29	274.44	228.64	271.06	-	245.66	82.32	90.99	323.11	205.09	33.90
APR	2717.37	1309.48	347.32	114.37	261.11	-	193.58	20.96	233.03	228.22	-	9.30
MAY	4771.99	1704.76	365.64	48.47	252.79	-	315.55	-	1797.28	203.45	64.00	20.05
JUNE	2791.13	1650.29	347.32	31.80	236.16	-	115.89	65.10	147.93	147.24	-	49.40
JULY	3308.28	1644.57	382.50	14.66	199.39	-	147.54	-	156.82	427.19	259.77	75.84
AUG	3628.79	2337.61	484.33	-	181.72	-	112.06	51.45	100.67	344.45	-	16.50
SEPT	3758.75	1647.91	274.03	1.60	197.32	-	195.62	757.00	174.51	175.27	331.59	3.90
OCT	3142.27	1625.14	292.36	-	244.48	-	251.91	-	385.35	291.73	-	51.30
NOV	3887.58	1652.01	-	62.44	254.87	293.74	91.75	77.06	351.02	660.01	338.68	106.00
DEC	3913.99	1696.06	-	75.96	257.98	573.49	232.91	36.60	4.56	918.31	-	118.12
TOTAL	41145.28	20694.25	2767.94	719.47	2917.70	1105.84	2302.57	1115.56	3673.74	3907.90	1437.10	503.21

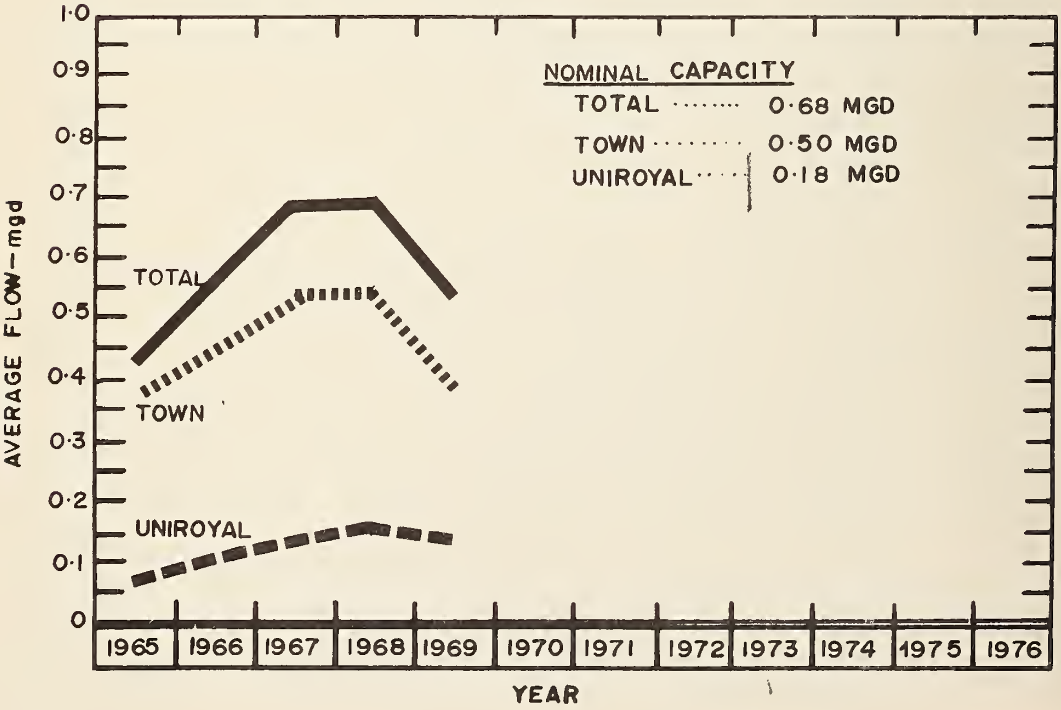
* SUNDRY INCLUDES SLUDGE HAULAGE COSTS WHICH WERE $2,012.00

PROCESS DATA



FLOWS

(COMBINED)



PLANT FLOWS and CHLORINATION

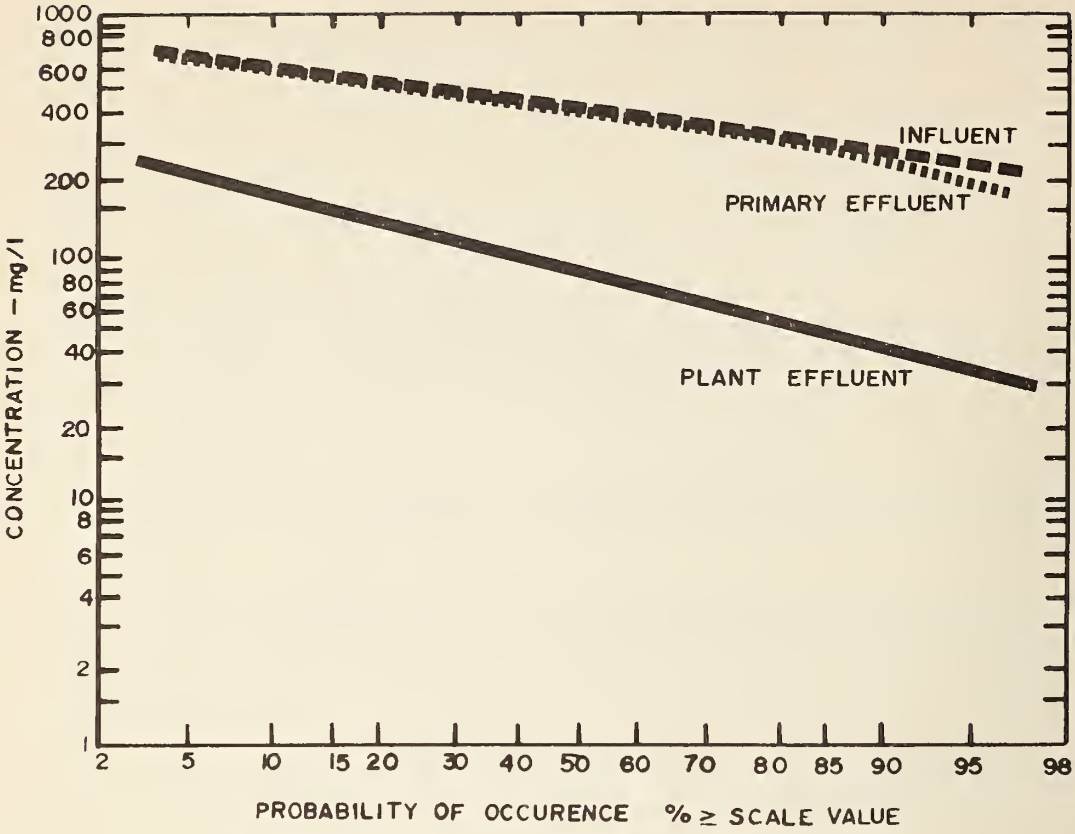
MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal	CHLORINE USED pounds	DOSAGE mg/l
JAN	17.6	.57	1.18	.36	438	2.5
FEB	13.4	.48	.90	.35	430	3.2
MAR	26.0	.84	1.95	.38	457	1.8
APR	26.5	.88	1.91	.48	458	1.7
MAY	22.7	.73	2.87	.48	461	2.0
JUNE	14.6	.49	.91	.31	424	2.9
JULY	12.4	.40	.69	.31	459	3.7
AUG	9.1	.29	91	.10	411	4.5
SEPT	11.3	.38	.51	.29	533	4.7
OCT	11.9	.39	.50	.32	430	3.8
NOV	14.5	.48	.85	.33	349	2.4
DEC	13.7	.44	.50	.37	444	3.2
TOTAL	193.7	-	-	-	5294	-
AVERAGE	-	.53	-	-	441	2.7

OPERATING SUMMARY

Week		UNIROYAL			TOWN			COMBINED				
								Raw			Final	
Ending		Flow MG	BOD	SS	Flow MG	BOD	SS	Flow MG	BOD	SS	BOD	SS
Jan.	4	.640	-	-	1.200	-	-	1.840	-	-	-	-
	11	1.120	900	200	2.000	250	200	3.120	500	200	170	120
	18	1.180	1100	100	2.750	280	200	3.930	400	740	180	80
	25	1.100	650	80	3.725	280	140	4.825	350	140	160	50
Feb.	1	.835	850	5	3.950	420	370	4.785	550	100	50	30
	8	.825	2300	40	2.875	200	100	3.700	500	120	44	40
	15	1.080	1300	20	1.750	190	150	2.830	440	130	200	50
	22	1.235	850	30	1.900	200	150	3.135	260	130	150	70
Mar.	1	1.260	-	-	2.100	-	-	3.360	-	-	-	-
	8	1.260	800	60	2.250	350	80	3.510	460	90	110	100
	15	1.230	1000	100	2.890	160	190	4.120	380	200	90	140
	22	.985	1500	150	6.490	240	90	7.475	90	70	75	80
	29	.950	1200	110	7.600	85	50	8.550	355	100	65	70
Apr.	5	.870	1400	120	5.950	150	150	6.820	320	120	55	90
	12	.985	1000	160	5.875	280	170	6.860	320	170	50	70
	19	1.110	700	90	5.325	260	220	6.435	400	150	65	130
	26	1.220	480	60	3.625	280	120	4.845	400	90	46	90
May	3	1.248	550	90	3.831	38	180	5.079	500	160	80	80
	10	1.258	1000	20	2.743	400	320	4.001	550	260	170	120
	17	1.258	850	150	2.883	170	150	4.141	340	190	65	120
	24	1.137	750	130	7.826	80	100	8.963	320	100	70	70
	31	.875	1400	230	3.100	220	170	3.975	600	130	46	70
June	7	1.174	950	170	2.949	300	180	4.123	420	170	95	90
	14	1.294	950	80	1.987	120	110	3.281	360	130	80	110
	21	1.241	1000	235	1.782	120	110	3.023	380	110	75	100
	28	1.308	1600	420	2.196	300	1060	3.504	500	320	200	260

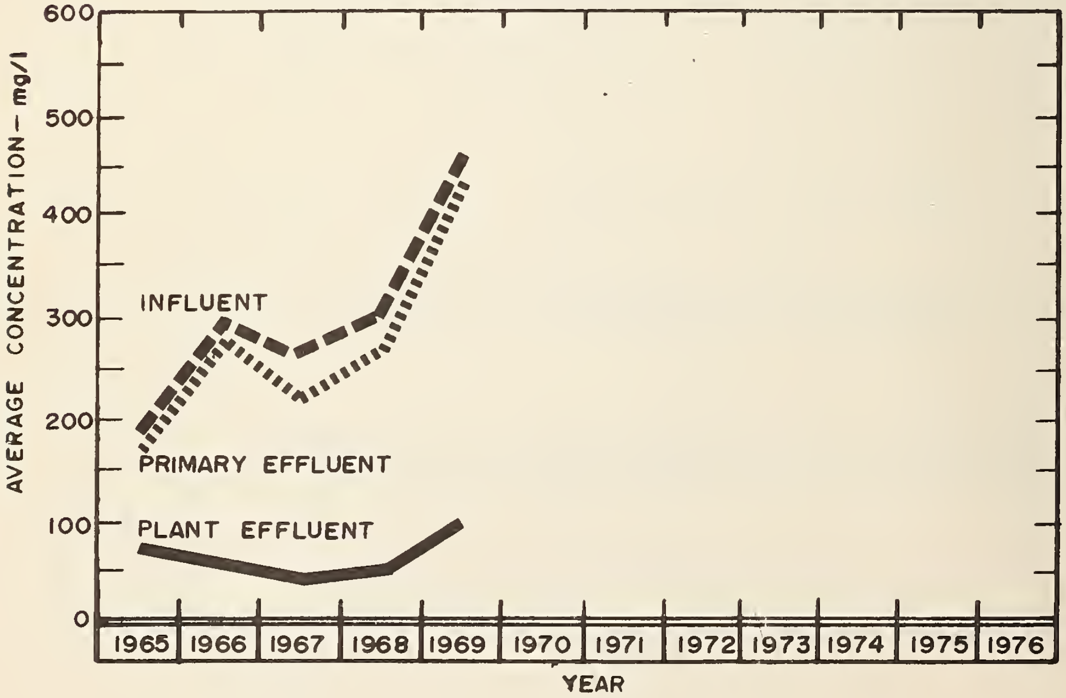
July	5	1.089	1200	590	1.469	190	220	2.558	460	400	120	100
	12	1.187	900	650	1.628	190	600	2.815	180	450	160	140
	19	1.228	900	170	1.698	200	230	2.926	460	160	65	100
	26	1.196	1800	270	1.686	-	-	2.882	550	180	260	140
Aug.	2	.779	-	-	1.734	250	170	2.513	400	170	170	210
	9	.201	-	-	1.270	340	250	1.471	275	130	84	125
	16	.393	820	80	1.324	235	190	1.717	350	140	28	50
	23	.757	1040	100	2.052	650	195	2.809	590	165	68	85
	30	.789	1600	90	1.371	340	175	2.160	650	165	95	90
Sept.	6	.749	1700	150	1.764	550	180	2.513	700	120	200	90
	13	.863	1600	370	1.956	400	350	2.819	850	330	280	170
	20	.784	1300	140	1.919	400	210	2.703	360	100	-	-
	27	.700	800	30	1.754	260	260	2.455	480	150	50	140
Oct.	4	.700	700	40	1.889	300	260	2.589	360	70	85	60
	11	.946	1100	140	1.830	440	390	2.776	600	390	80	170
	18	.848	800	110	1.662	260	230	2.510	300	130	65	30
	25	1.097	1000	100	1.564	260	200	2.662	600	250	85	90
Nov.	1	1.235	800	50	1.679	420	150	2.914	440	150	34	40
	8	1.190	1300	120	2.005	280	170	3.194	650	180	95	90
	15	1.249	1100	120	1.844	240	210	3.093	600	140	130	70
	22	1.058	-	-	2.865	-	-	3.923	-	-	-	-
	29	1.158	2000	10	2.252	360	140	3.410	630	70	95	80
Dec.	6	1.085	-	-	2.072	-	-	3.157	-	-	-	-
	13	1.097	1050	80	2.126	325	200	3.224	590	100	150	70
	20	1.016	1050	120	2.211	230	240	3.227	500	370	86	80
	27	.949	-	-	1.990	-	-	2.938	-	-	-	-
	31	.476	1300	90	1.081	320	125	1.557	480	200	65	110
Total		53.497			140.247			193.744				
Average		.147	1107 *	140 *	.384	273 **	215 **	.531	453 ***	184 ***	105 **	97 **

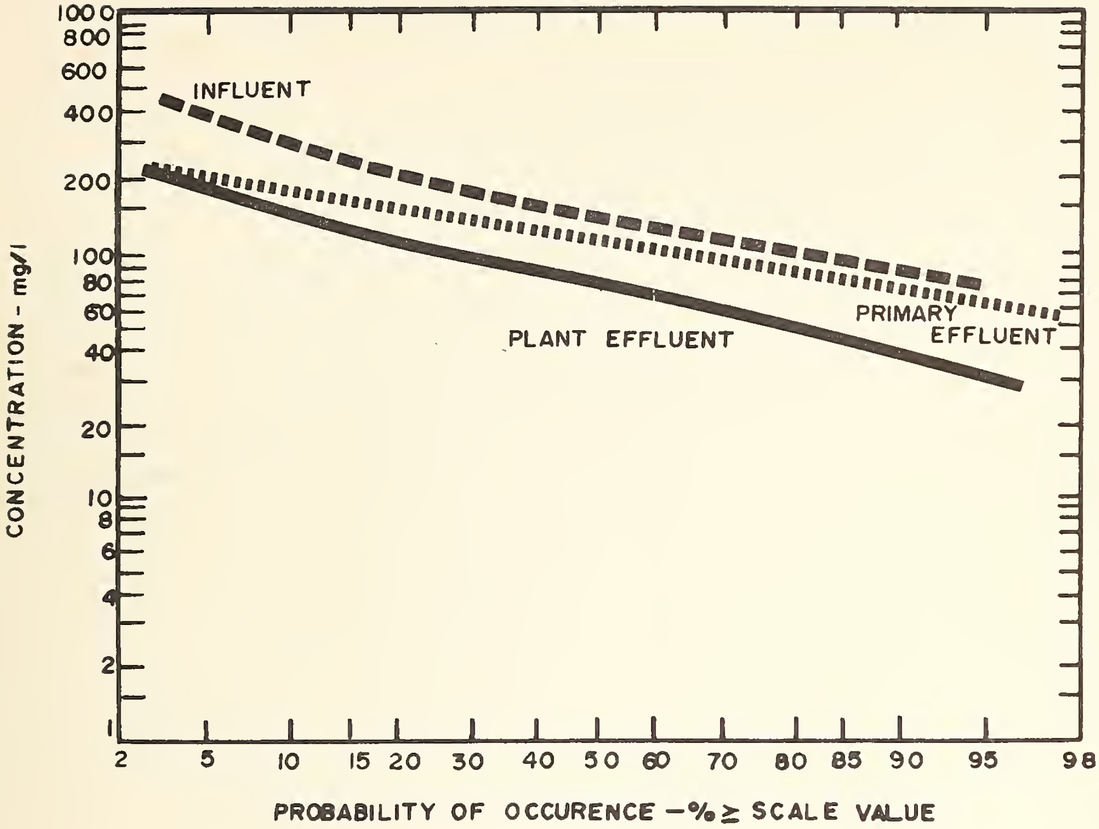
* 46 samples
** 47 samples
*** 48 samples



BIOCHEMICAL OXYGEN DEMAND

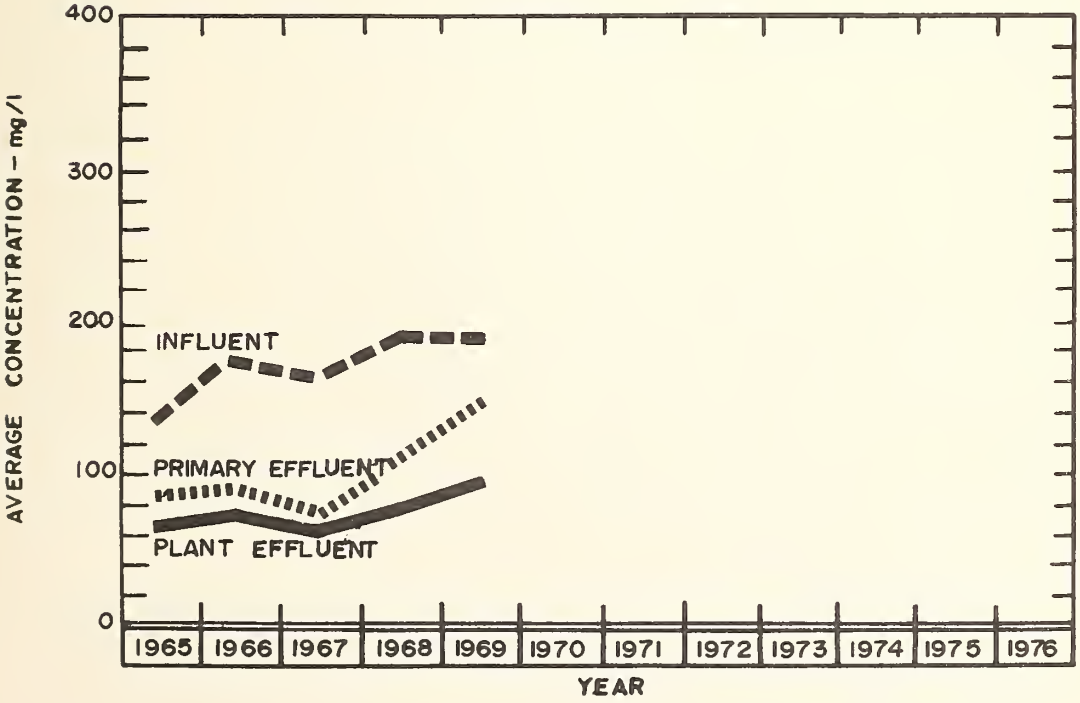
(COMBINED)

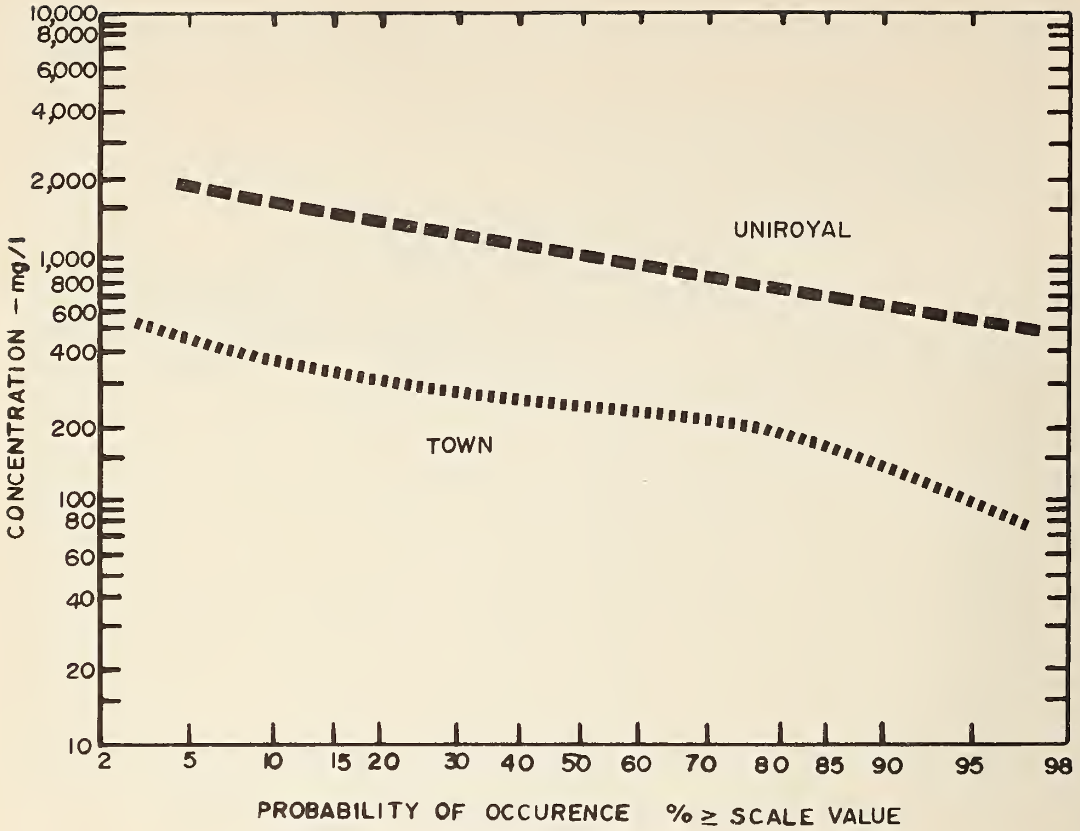




SUSPENDED SOLIDS

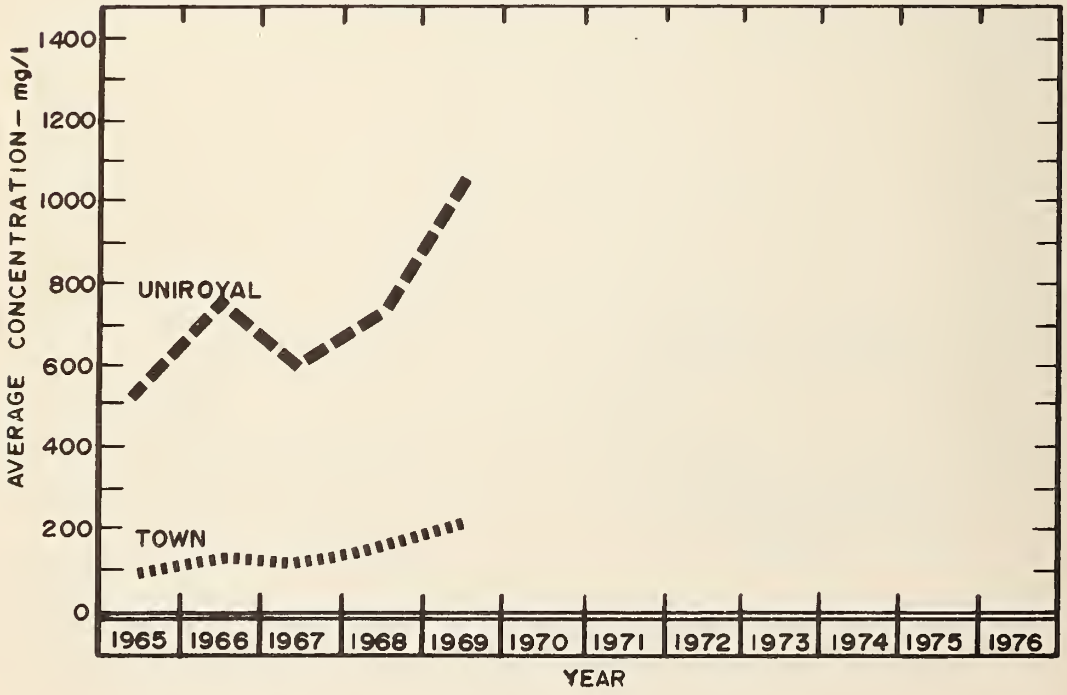
(COMBINED)

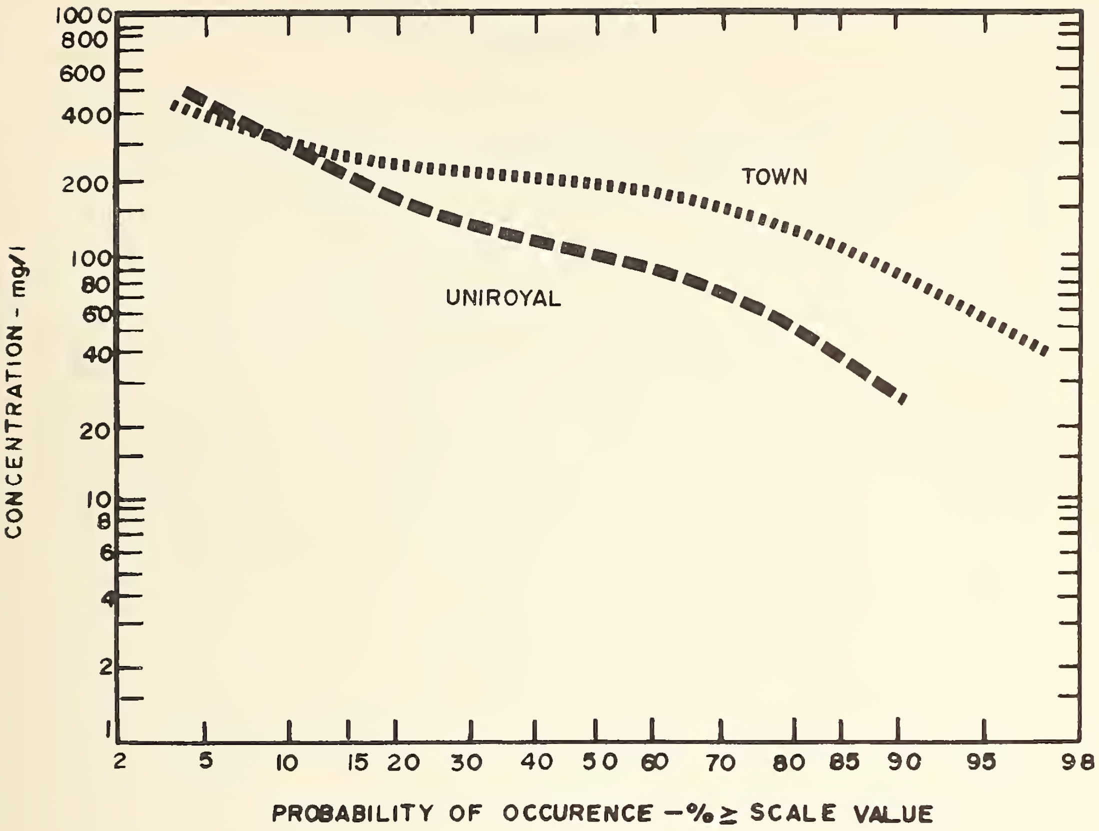




BIOCHEMICAL OXYGEN DEMAND

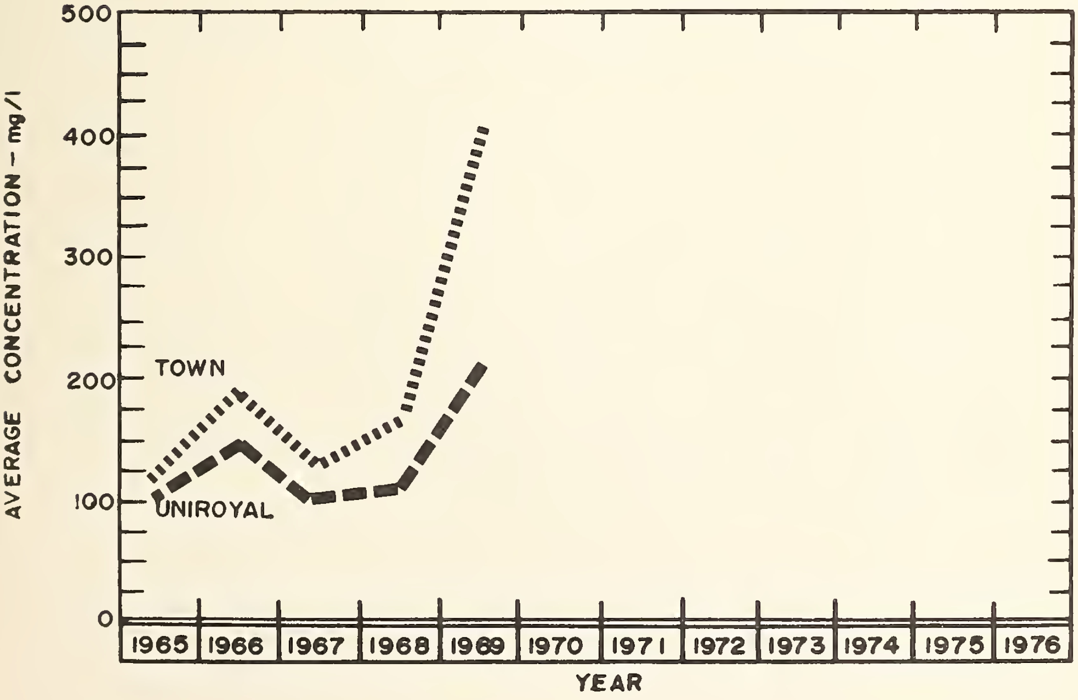
(UNIROYAL and TOWN)





SUSPENDED SOLIDS

(UNIROYAL and TOWN)

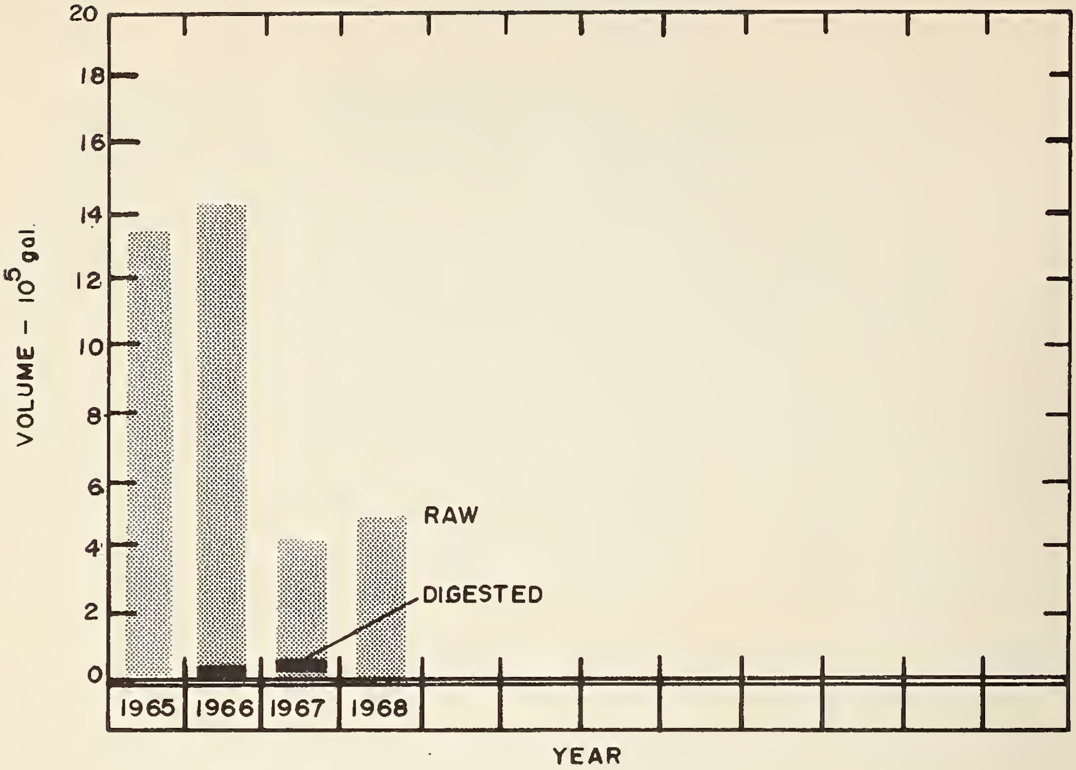


PLANT EFFICIENCY

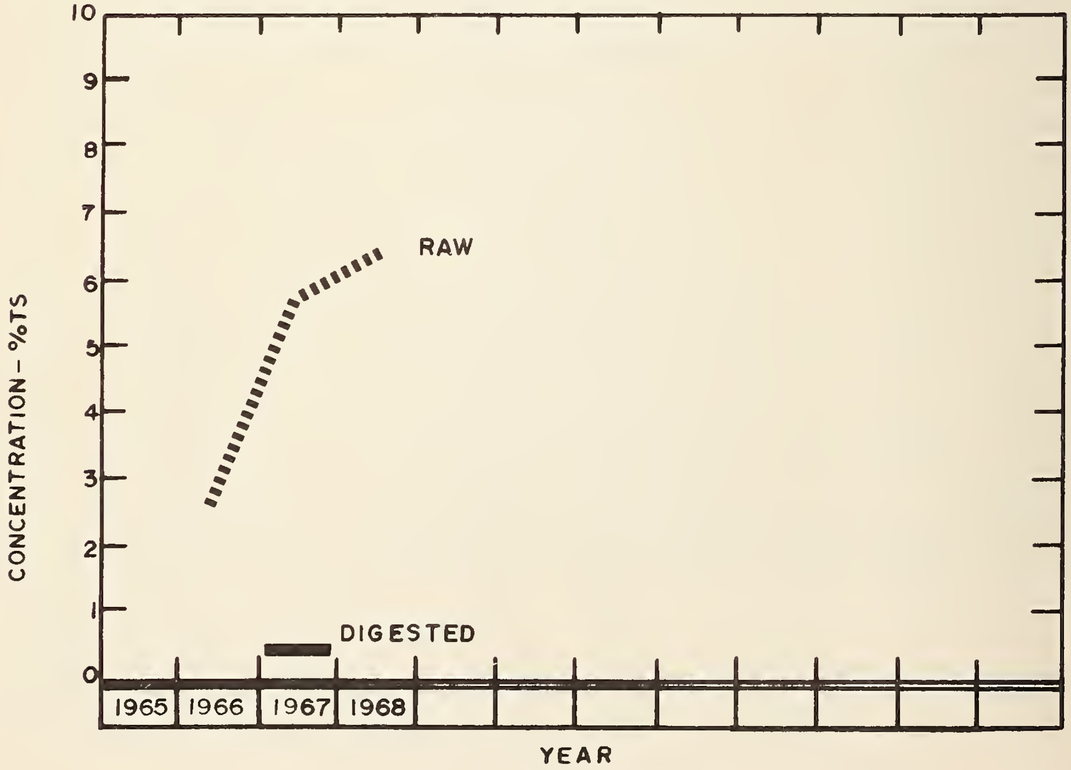
MONTH	BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS			
	INF.	EFF.	REDUCTION		INF. CONCN	EFF. CONCN	REDUCTION	
	mg/l	mg/l	%	10^3 pounds	mg/l	mg/l	%	10^3 pounds
JAN	450	140	69	54.6	295	70	76	39.6
FEB	400	131	67	36.2	126	53	58	9.8
MAR	321	85	74	61.5	115	98	15	4.4
APR	360	54	85	81.2	132	95	28	9.8
MAY	462	86	81	85.3	168	92	45	17.2
JUNE	440	113	74	47.8	183	140	23	6.3
JULY	410	155	62	31.8	272	138	49	16.7
AUG	466	68	85	36.1	150	88	41	5.6
SEPT	597	176	71	47.6	175	133	99	4.7
OCT	460	70	85	46.5	198	78	61	14.3
NOV	627	107	82	75.2	130	80	38	7.2
DEC	523	100	81	57.8	223	86	61	18.7
TOTAL	–	–	–	–	–	–	–	–
AVERAGE	460	107	77	55.1	180	95	47	12.9

AERATION

MONTH	AVG DAILY FLOW mil gal	AERATION INF.		SECONDY. EFF.		MLSS CONCN mg/l	F/M lb BOD / lb MLSS
		BOD mg/l	SS CONCN mg/l	BOD mg/l	SS CONCN mg/l		
JAN	.57	448	118	140	70	2380	.35
FEB	.48	470	113	131	53	3260	.23
MAR	.84	313	100	85	98	2740	.32
APR	.88	310	130	54	95	2470	.37
MAY	.73	444	466	86	92	2090	.51
JUNE	.49	410	160	173	140	2480	.26
JULY	.40	418	150	155	138	2450	.22
AUG	.29	385	111	68	88	3080	.12
SEPT	.38	570	115	176	133	3220	.22
OCT	.39	448	114	70	78	3340	.17
NOV	.48	613	80	107	80	3270	.10
DEC	.44	420	96	100	86	4760	.13
TOTAL	-	-	-	-	-	-	-
AVERAGE	.53	437	146	112	95	2960	.25


20
18
16
14
12
10
8
6
4
2
0
VOLUME - 10^5 gal.
RAW
DIGESTED
1965
1966
1967
1968
YEAR

DIGESTION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CONCENTRATION - %TS
RAW
DIGESTED
1965
1966
1967
1968
YEAR

SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE		SLUDGE DISPOSAL
	TOTAL SOLIDS %	VOL. SOLIDS %	LIQUID (10^3 gal)
January	4.3	69	31.8
Feburary	3.7	66	39.7
March	4.2	67	36.0
April	4.8	72	23.3
May	4.9	65	19.5
June	4.8	57	82.2
July	8.2	56	52.4
August	5.9	56	31.9
September	-	-	56.1
October	-	-	36.8
November	-	-	33.9
December	7.0	74	40.2
TOTAL	-	-	483.8
AVERAGE	5.3	64	40.3

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Date Due

TD/227/E55/W38/1969/MOE
Ontario Water Resources Co
Elmira water
pollution control plant : asvv
1969 operating c.1 a aa
summary

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Water management in Ontario